Following the use of the serum injections a general urticarial eruption was observed in seven patients. Other than slight pain at the site of the injection and the urticarial eruption, accompanied by the most intense itching, no local or general toxic manifestations were observed.

1831 Chestnut Street.

ELEMENTS OF PSYCHIATRIC PROGNOSIS*

F. X. DERCUM, M.D.
Professor of Nervous and Mental Diseases, Jefferson Medical College; Neurologist to the Philadelphia Hospital.
PHILADELPHIA.

The prognosis of mental disease offers, as is well known, peculiar difficulties. These difficulties are due to our lack of knowledge of the morbid agents at work, of their mode of action, of the physical make-up of the patient, and in a still greater degree to imperfect clinical data.

THE ELEMENTS OF THE PROBLEM.

Our knowledge of the first group of facts, namely, of the morbid agents, is in itself most imperfect and is limited to a few of the agents concerned in the insanities of intoxication, to a few concerned in the insanities resulting from infection, and to a still smaller number concerned in the insanities of autointoxication, such as the diathetic insanities and the insanities dependent on thyroid derangement.

Our knowledge of the second class of facts, namely, those dealing with the structural peculiarities of the patient, is still more unsatisfactory; it is embraced in the rather vague conceptions conveyed by the term neuropathy. We can express our ideas concerning the latter only in a general way. A neuropathy means departures in morphology, arrests, deviations affecting the skull, the limbs, the nervous system, the vascular apparatus and other structures; in other words, it means departures from the normal of the organism as a whole. It follows that the ductless and other glands and the tissues generally, each of which contributes its modicum to the various fluids of the body, the blood, the lymph, the cerebrospinal fluid, as the case may be, are involved in the imperfect and aberrant development. It would seem that in neuropathy the conditions present are such as to imply a diminished resistance on the part of the nervous system on the one hand, and a toxic metabolism on the other. Further than such a general expression it is as yet impossible to go, however, and the difficulty of prognosis is still further increased by the great range of variation in individual cases both as to symptoms and course. In individual cases, in consequence, it is usually possible to make only general statements as to probability of outcome and none but the coarsest approximations as to duration.

Of necessity we are compelled to rely on factors purely clinical in their nature. Our clinical knowledge has made great and increasing advances. Since the epoch-making studies of Kahlbaum and Hecker, and especially since the more recent recognition of dementia præcox by Pick and its subsequent expansion by Kraepelin, our conceptions have become more and more clear. This is true not only of the dementia præcox group, but also of the manic-depressive group. Notwithstanding our knowledge, from the very nature of the subject, must continue to lack precision. No measure of exactitude can apply. As a rule, a general statement only as to the outcome may be hazarded and then only as to the outcome from an existing attack. None but very coarse estimations can be made as to duration, and none whatever as to possible recurrences or as to the extent of intervals of mental health. Owing to numerous and complex factors, at present indeterminate and indeterminable, such as the facts of causation and the facts embodied in the neuropathy of the patient, the degree of his resistance and his power of repair, the problem of prognosis must unquestionably remain in given cases very difficult.

The points which enter into the problem are: First, the clinical form assumed by the mental disorder; second, the presence or absence of actual quantitative mental loss; third, the systematization of delusions; fourth, the fixation of symptoms; fifth, age; sixth, sex; seventh, the presence of morphologic or somatic stigmata; eighth, the significance of heredity; ninth, the bearing of social status.

APPLICATION OF DATA TO PROGNOSIS.

Mental diseases can be roughly divided into two classes. The first class consists of those which are essentially neuropathic—that is, autogenetic. This class includes dementia præcox, paranoia, the manic-depressive group and the neurasthenic insanities or psychasthenias. The second class includes those dependent on infection, intoxication, trauma or other extraneous causes—that is, affections which are exogenetic. This class includes many forms of delirium, confusion and stupor.

Obviously these two classes present primarily widely differing factors in prognosis. It goes without saying that the prognosis of the first class is in general terms far less favorable than that of the second and it will serve our purpose best to begin with a consideration of one of the groups of the latter—for instance, the heboid-paranoid group, the groups to which the general term of dementia præcox has of late years been applied. We are all familiar with the statements made by the great exponent of the modern view of dementia præcox, Kraepelin, regarding the probabalities of recovery in hebephrenia, catatonia and in dementia paranoides. The proportion of recoveries given by him for hebephrenia, namely, 8 per cent., and for catatonia, 20 per cent., I believe to be too low. There can be no doubt that if the milder extramural cases were included the proportion of recoveries would be higher. However, even if we had definitely determined the average proportion of cases of recovery, this of itself would be of but little value in the prognosis of individual cases. Unfortunately also the attitude of physicians in regard to dementia præcox is such as to negative a consideration of individual prognosis, for the very name of the affections implies an unfavorable outcome. Nevertheless, the remarkable improvements, not to speak of the complete recoveries now and then observed, both in hebephrenia and catatonia and even in paranoid forms, make it imperative that each individual case be studied for itself. The question arises as to the principles that should here be applied.

The members of the heboid-paranoid group, hebephrenia, catatonia and paranoid dementia, are so closely related that they can safely be considered together.

* Read in the Section on Nervous and Mental Diseases of the American Medical Association, at the Fifty-ninth Annual Session, held at Chicago, June, 1908.

If the first of the list of factors, namely, the form assumed by the mental disorder, be now applied, it is noted, of course, that the presence of catatonic symptoms lends a more favorable aspect to the prognosis than does hebephrenia, while dementia paranoides is the least favorable form of all. This result is, however, of general value only.

On the other hand, the second factor, namely, that as to the presence or absence of quantitative mental loss, that is, of true dementia, furnishes a test which, when it can be applied, is of very great value. Its application is often very difficult, and yet if certain elementary facts be borne in mind the application frequently becomes possible. As I pointed out some two years ago in a paper read in Baltimore, in both hebephrenia and catatonia, it is confusion and not dementia which dominates the clinical picture. All of the elements of confusion are present, hallucinations and illusions, associated with fugitive, changing, unsystematized delusions. In periods of excitement this confusion may attain the intensity of delirious episodes, or, on the other hand, it may deepen, as it habitually does in catatonia, into stupor. Delirium, confusion and stupor are, of course, closely related states, and that they may occur in varying degrees in hebephrenia and catatonia, is, of course, a matter of common experience. The element of confusion in dementia præcox is habitually lost sight of in the discussion of the subject.

Because of the name we habitually think of dementia præcox as a disease which is a dementia primarily and of which the dementia is the most prominent feature. Let us see whether the facts really justify such a position. If we compare the symptoms presented by a case of unquestionable dementia, such as a senile dementia, with the symptoms presented by a case of dementia præcox, we note striking differences. The use of the term "dementia" should be limited to a quantitative change of mind, that is, to the loss of faculty and not to a mere change of quality or change in the mode of action. In a case of simple senile dementia, that is, a case uncomplicated with hallucinations or delusions, we find in the very beginning an impairment of memory, an impairment which makes itself evident at first in the failure to remember how the daily tasks that make up the life of the individual are to be performed, in forgetfulness of the daily duties, obligations and proprieties. As is well known further, this loss of memory involves at first recent events, those which have made the least profound impression upon the mind. It is hardly necessary to dwell here on the characteristics of this impairment. We need only recall the loss of names of common objects, the names of intimate friends and relatives, of the needless repetition of statements, of the garrulousness of old age. No comment is necessary to illustrate these well-recognized inroads into the mental integrity. Professional attainments, languages, the whole of the acquired knowledge of the middle and finally the adolescent periods of life are lost, leaving nothing but the acquisitions of earliest age and sometimes not even these. Compared with this condition of memory, that which obtains in dementia præcox is strikingly different. Disorders of memory are not, to say the least, the initial features of dementia præcox. Indeed, as is well known, memory is, in the beginning and for a long time after the affection has become established, well preserved. It is only after the disease has persisted for a relatively long time that actual loss of memory becomes evident. Further, in dementia præcox, the consciousness of the patient—stuporous states, of course, excepted—usually remains remarkably clear. In true dementia, such as is seen in senile dementia, consciousness, on the other hand, is usually more or less clouded. Still further, in dementia præcox, orientation, a function dependent on the integrity of a great group of complex faculties, is well preserved, the patient being usually in correct relation with his environment—of course, again excepting stuporous states. In dementia, as illustrated by senile dementia, there is frequently gross impairment of orientation, the degree of this impairment being in direct relation to the degree of quantitative mental loss. It is only at a relatively late period that dementia præcox presents changes alike in memory and in orientation. In keeping with this view Regis, Christian, Anglade, Macpherson, Knapp and others classify dementia præcox under confusional insanity.

Many facts also suggest that dementia præcox is due to a toxin or toxins and if so this would bring dementia præcox within the range of the toxic confusions.

The first problem, therefore, presented by a given case of hebephrenia or of catatonia, is to determine the presence of actual mental loss. If such mental loss can not be demonstrated, and if the symptoms of confusion alone are present, the case should be regarded as one in which improvement or recovery is still possible. Under these circumstances we have certainly no right to predicate a necessarily unfavorable outcome.

The determination of the question of mental loss may under given circumstances — that is, in stuporous or deeply confused states—be one of extreme difficulty. However, the mere fact that confusion and stupor are the dominant features lends presumption to the view that they and not dementia are present.

The next point that presents itself is that of the systematization of delusions. Systematization must be considered as a feature apart from fixation, because systematization and fixation do not necessarily go hand in hand. As is well known, systematized delusions that are not fixed constantly occur and, on the other hand, many mental phenomena are met that are fixed and yet do not consist of systematized delusions. The systematization of delusions embraces primarily two distinct factors:

First, in order that delusive ideas should be coherently and logically arranged it is to be presupposed that the mind must have attained a certain degree of development. It is a well-known fact, pointed out statistically years ago by Pickett, that the paranoid cases are found among patients distinctly older than in catatonia or hebephrenia. While in the hebephrenic and catatonic the hallucinatory states are associated with and perhaps give birth to painful delusive ideas, these ideas are not arranged, the suffering of the patient is not logically reasoned out and systematization does not result, although the patient in a vague way presents the paranoid attitude of mind in so far as he projects the causes of his sufferings to sources that are outside of himself. Painful ideas characterized by suffering, torture, poisoning, burning, mutilation inflicted on him, are usually present in such number and such prominence as to dominate the picture and to indicate clearly the reference by the patient of his sufferings to agencies in the external world, and yet systematization is not present. On the other hand, cases are met, both of hebephrenia and catatonia, in which, especially in the older hebe-

phrenics, the delusions are more clearly paranoid: so much so, indeed, that one is sometimes in doubt whether to classify the case among the hebephrenics or among the paranoid dementias.

It has been the habit to regard cases presenting paranoid delusions as cases in which an unfavorable outcome is foreshadowed. However, it is also a matter of experience that the existence of systematized delusions does not necessarily mean permanency. Time and again it is noted that delusions, though systematized, are poorly systematized and again that they are changeable, manifold and shifting. Time and again improvement and actual disappearance of delusions are noted in such cases. Indeed, even patients in whom a paranoid system of well-defined delusions has been observed may recover. Such a case has been reported by Dewey, and I have myself observed two such instances, one of them during the past year. The patient was a man in the early forties in whom a series of persecutory ideas, associated and possibly based on hallucinations, made their appearance. They persisted for many months, and yet along with an improvement in the general health they disappeared just as completely as do the symptoms of confusion in other cases, the man making a complete recovery.

Another factor to be considered in the systematization of delusions is the intensity of the symptoms. If the mental disturbance be attended by marked excitement and the rapidity of the elimination of ideas be greatly increased, confusion dominates the picture; if the intensity of the disturbance be less pronounced, if, in other words, the confusion is mild in degree, systematization or — perhaps better — pseudo-systematization may be present. Thus the same case of hebephrenia or paranoid dementia may present a varying picture.

In answer to the question whether systematization of itself negatives recovery, or whether it greatly increases the improbability of recovery, it must be admitted that in the larger number of cases systematization must be regarded as a very unfavorable sign. If the delusions lack fixation, however, if they remain ill-defined, and especially if they vary markedly from time to time, the possibility of their disappearance must at least be conceded.

The question of fixation demands special consideration. I am in the habit in my lectures of defining a delusion as a false belief concerning which the person holding it is incapable of accepting evidence—that is, such evidence as is accepted by the average or normal mind. A delusion presupposes some break in association, either temporary or permanent. If the break in association is temporary, such as would be induced by the action of a toxin, the delusions would of necessity be temporary only and we would be inclined to expect a shifting picture of delusive beliefs. It is only when a delusive belief has become fixed that we have the right to conclude that the break in the association has become permanent. It is fixation, therefore, which is the unfavorable sign and not mere systematization. Systematization and fixation, it is true, commonly go hand in hand, but they are not necessarily correlated—not necessarily associated. Fixation, as is well known, occurs in association with other mental phenomena such as those presented by the special forms of fear, by the insanity of indecision, by the defects of will and of inhibition met with in psychasthenias and of which persistence is a well-known characteristic. Fixation in association with systematization of delusions is necessarily a factor of unfavorable prognosis. Fixation greatly lessens the probability of recovery.

The remaining points entering into the prognosis may be considered rather briefly. As regards age, a priori considerations are confirmed by clinical experience, namely, that other things being equal, the younger the individual the greater the possibility and probability of recovery. This can be distinctly claimed for the heboid-paranoid group and it is undeniably true of the manic-depressive group. Cases of hebephrenia or catatonia manifesting themselves relatively late present a greatly lessened prospect of recovery. For instance, in the earlier catatonics, the percentage of recoveries is relatively large; in the late catatonics it is relatively small. As regards the manic-depressive group, it is absolutely true that the prognosis of the individual attacks is infinitely more favorable, especially as regards duration in the younger patients, that is, those of the third decade as compared with those of the fourth and fifth decades of life. How much more prolonged a middle-age melancholia is than a melancholia of early life need not be dwelt on. In general terms, the psychoses met in middle life and old age are far more serious in their outlook both as to duration and eventual outcome than are those of early life.

The sixth point, that of sex, is so extensive as to preclude extended consideration here. Suffice it to say that the relation of the menstrual function to fluctuations in the psychoses must be borne in mind, as must also the unfavorable influence of a prolonged menopause on duration.

The seventh point, the significance of morphologic or somatic stigmata, that is, stigmata indicative of imperfect evolution, next claims attention. Briefly, it may be stated that when markedly present or when present in large number, they are in keeping with defective or aberrant mental development. Again, unless present in marked degree, they have none but indirect bearings on the problem of prognosis, as they are sometimes found associated with entire mental health.

What significance should be attached to the eighth point, namely, that of heredity? That a history of insanity in the ancestry has a profound significance in all cases of mental disease goes, of course, without saying. Sometimes, indeed, it has a special significance as, for example, in melancholia, a disease which occasionally repeats itself with fatal similarity in successive generations. A neuropathic heredity explains in a sense the occurrence of an insanity, but it influences the prognosis of a given attack in only a general way; it can not give us a definite clue as to either outcome or duration. However, it always influences unfavorably the prognosis as to permanency of recovery. Further, it may also influence the prognosis as to the course of an attack. Thus, if neuropathic heredity be pronounced, the course will probably be wave-like, or the symptoms may in other ways indicate a periodic or cyclic course.

The remaining point, that of the social status of the patient, is in given cases of considerable importance. A higher social status implies, other things equal, an ability on the part of the patient to provide himself with better surroundings than those which he can secure in institution life. There can be no question that the prognosis of a given case of hebephrenia or of catatonia is greatly enhanced by circumstances which permit the carrying out of elaborate methods of inducing hyper-

nutrition, that is, methods embodied in absolute rest, full feeding, massage, bathing and the other physiologic methods found so useful in the treatment of exhausted states. The great importance of trained nursing and individual nursing must also be recognized. There can be no doubt, for instance, that the percentage of recoveries and of improvement in hebephrenics is greater under such methods of treatment. Unfortunately, elaborate methods, such as are necessary in a properly conducted rest cure, are expensive and are beyond the reach of the great mass of patients in mental cases.

As regards the class of cases which comprises those not essentially neuropathic, that is, those whose mental disturbance is dependent on infection, intoxication, trauma or other extraneous causes, they present, as is well known, other things equal, a favorable prognosis. Of course, the most favorable are the simple toxic deliriums and confusions. If elements of neuropathy are present these proportionately diminish the favorable outlook.

SUMMARY.

In summarizing the considerations contained in the above paper, I would lay stress especially as of importance in the prognosis of mental diseases on: First, the presence or the absence of actual dementia; second, the presence of systematization of delusions; third, the presence of fixation; and, fourth, the social status of the patient.

The limits of this paper will not permit me to discuss the prognosis of the various clinical forms or even special questions that play an important part in the prognosis. Among the latter may be mentioned the influence of the bodily condition and the significance of visceral complications. In a general way only it may be said that if there be marked physical improvement without corresponding mental improvement, the prognosis becomes proportionately unfavorable. Equally true is the converse, that is, the less frequent condition in which there is mental improvement without physical improvement; such cases should always be regarded with suspicion. Again the marked persistence of hypochondriacal ideas, especially of ideas of somatic and psychic negation, that is, belief in the absence or destruction of viscera, of psychic non-existence, or psychic perpetuity (the belief that the patient is dead or, on the other hand, that he can not die) are not infrequently found associated with chronic and non-recoverable cases.

Special factors, such as interruption and cessation of progress also influence the prognosis unfavorably. Similarly, an incomplete recovery renders recurrence not improbable. Further, one attack presenting a wave-like course raises the presumption of other attacks in the future.

Among favorable features may be mentioned regularity of course, concomitant physical and mental improvement, and, finally, the realization on the part of the patient that he has been ill.

1719 Walnut Street.

DISCUSSION.

DR. W. T. WILLIAMSON, Portland, Ore.: Dr. Dercum is disposed to deprive dementia præcox of the element usually considered the basic fact, that is "dementia," and supply in its stead simply "confusion." It has been rather difficult to separate one form of it, the paranoidal variety, from true paranoia, and the method by which we could, if at all, keep them apart, was by the recognition of dementia of a true type as a feature of the dementia præcox, and the dementia of paranoia, when present, as being simply a pseudo form. The fixity of a delusion depends on the strength of the mind in which it rests. If there is a great degree of dementia present it would appear to be impossible for a delusion to maintain itself as one of fixity; and therein I think we would find a difference between the paranoidal form of dementia præcox and true paranoia. The paranoiac must have strength to cling to a belief, especially if it be surrounded with systematized delusions that give it an air of possibility. I would like Dr. Dercum's opinion as to whether it is not true that one of the distinctive features of difference between dementia præcox and paranoia would be the existence of true dementia in the former and only of a pseudo-dementia in the latter; and whether also it is not true that in those hebephrenic forms which have such a comparatively favorable prognosis as to recovery, there is not foreshadowed and threatened the same terminal dementia that characterizes cases which do not recover, or which because of the removal of the toxic or other agencies which tend to the perpetuation of the condition, simply escape before this change has taken place.

DR. ALBERT E. STERNE, Indianapolis: We should take out of the group of dementias what does not belong there; we should reserve our conception of dementia for that which goes hand in hand with an organic decay, an actually destructive lesion of the brain cell, a practically incurable condition—a true dementia. Dr. Dercum mentions the quantitative loss, but means no doubt to include the qualitative loss also in mental acuity. I have frequently been deeply impressed with this feature of the prognostic aspect of the various insanities. It has seemed to me that most physicians are not sufficiently ready to regard those mentally ill as sick people. This is especially true, it seems to me, of the acuter conditions. I have through a long term of years come to the belief that mental conditions do not rise out of the surrounding ether, but have a distinct basis; that these patients are sick. I have never been, in meeting mental conditions, more deeply impressed with the truth of this than in those cases to which Dr. Dercum refers, namely the confusional type, especially in the hebephrenic class. It has been my invariable custom to treat these patients as seriously sick and to keep them in bed. Temperature and heart action should be carefully watched. I have been surprised innumerable times to find a rise in temperature sometimes up to 102, possibly a little higher—with a disturbance of the heart action—a marked irregularity in several cases. I have been imbued with the feeling that these cases are of cerebral character—a true inflammation of the cerebral tissue. I have not been able to believe that we are dealing merely with toxic conditions because the heart action does not simulate that which we see in those cases which we term toxic insanities ordinarily. The prognosis in these confusional cases is not so bad. I agree with Dr. Dercum that the relative number of recoveries in this class of cases is much higher than is commonly believed; and I believe it is the fault of the treatment rather than the condition itself which makes the number of recoveries low. By this I mean that we are inclined to neglect the truly serious physical aspect of such cases on account of the prominence of those symptoms commonly designated as mental.

DR. F. X. DERCUM: It is easy to differentiate between dementia præcox and simple dementia. In an ordinary case of senile dementia, among the early symptoms are failure of memory, of orientation, and gradually the faculties generally. Preservation of memory, even in cases which become finally demented, and full preservation of orientation exist in dementia præcox. The term *démence précoce* is unfortunate and has given rise to an unfortunate mental attitude with regard to these cases. Dementia præcox occurs in a very large number of cases in persons who are neuropathic—who are organically and structurally defective. There are in them some disturbances of development, arrests or deviations involving the organism as a whole, the nervous system, bones and muscles, cardiovascular apparatus, and no doubt also the ductless glands. When puberty is reached and the organism is obliged to adapt itself to new conditions, it can not meet the demands made on it; the patients become toxic, suffer from a toxic metabolism and present the mental symptoms of toxic

confusion. A case of organic dementia certainly presents a very different picture from dementia præcox. Hebephrenia, catatonia, paranoid dementia, paranoia hallucinatoria and paranoia simplex are all closely related. They form a natural series. As practical physicians we ought to remember that many of the patients, though they are defectives, are suffering in addition from exhaustion and that frequently they can be improved and at times even cured by rest and hypernutrition, methods that are beginning to be used more and more.

EPIDEMIC INFANTILE PARALYSIS.*

M. ALLEN STARR, M.D., LL.D., Sc.D.
Professor of Neurology, Columbia University.
NEW YORK.

During the summer of 1907 an epidemic of infantile paralysis occurred in New York City and its vicinity. The number of cases (probably over 2,000) was so many, the extent of the disease in the city and along Long Island Sound into Connecticut and up the Hudson River as far as Ossining was so rapid, the severity of the cases was so intense and deaths from the disease so frequent, that the epidemic excited a great amount of interest both among the laity and the profession. It seems wise, therefore, to put on record some special account of this epidemic, to call attention to particular clinical features that were presented, to trace the course of the cases as far as possible, and also to bring together an account of other epidemics that have occurred in the past, inasmuch as a large number of records have now accumulated concerning the prevalence of this disease in epidemic form.

Through the kindness of Dr. Simon Flexner I am enabled to present the results of a biological study, made by Dr. Martha Wollstein at the Rockefeller Institute, of the cerebrospinal fluid from cases of the disease, and also the results of an autopsy on one case.

THE COURSE OF THE EPIDEMIC IN NEW YORK.

The epidemic of poliomyelitis occurring in the city of New York in 1907 began about May. The number of cases increased steadily during June and July, the height of the epidemic occurring in August and September. Cases continued to appear in October, and a few were reported in December. The epidemic was widespread, cases occurring not only in the city of New York, but also in Brooklyn, Long Island City and the Bronx. Some cases were also reported on Staten Island, and many cases were seen along the Hudson River as high as Ossining, which is fifty miles from New York. Cases were also reported along the sound at Mount Vernon, Stamford and Norwalk (forty miles from New York), and in some of the valleys of Connecticut within twenty miles of the sound. Cases were not observed in New Jersey or in the suburbs of Newark. It is estimated that nearly 2,000 cases of the disease occurred during this epidemic, and the mortality was probably 6 per cent. to 7 per cent.

The summer, though a hot one, was not unusually so; but it was unusually dry, the reports of the weather bureau showing that the rainfall was 1.18 inches in July and 2.48 inches in August, less than half that of previous years. Other infectious diseases were not particularly prevalent.

In but few of the cases of infantile paralysis recorded had there been any preceding infectious disease.

The onset of the disease was uniformly accompanied by a brisk febrile movement, temperature rising to 101 to 103 in the first twenty-four hours; sometimes by a slight chill (but this was the exception); usually by vomiting, malaise, general sweating, general severe pains in the limbs and in the back, sometimes attended by some rigidity of the spine and even in some cases by retraction of the head giving rise to the suspicion of a beginning meningitis. The excessive sweating which attended the fever has been observed in other epidemics, and is interesting in view of the fact that it implies an involvement of the vasomotor centers in the gray matter of the cord. Diarrhea frequently followed on the second day and continued for two or three days. Delirium was a common accompaniment of the fever on the second or third day. The febrile movement lasted from five to nine days in the majority of the cases. It was rarely attended by very high temperature, and even in the fatal cases temperatures above 104 were the exception. On the third or fourth day of the disease the paralysis was discovered. It may have developed a little earlier, perhaps on the second day in some of the cases, but the children were confined to bed; they were usually extremely tender to touch and showed such pain on movement that they were allowed to lie quiet, and hence the paralysis very often escaped notice until the third or fourth day. It usually appeared with considerable suddenness and at its maximum extent from the beginning. It remained as the chief symptom after the fever had subsided and after the pains had become less. In the vast majority of the cases the legs were chiefly affected. In some of the cases the disease affected the arms as well; in some cases the muscles of the back and even of the abdomen were affected. In a few cases paralysis extended to the neck and to the face, and in a few cases the eye muscles were also involved. The picture was, therefore, in some cases that of poliomyelitis of the ordinary recognized type; in other cases, of poliomyelitis with bulbar paralysis; in other cases, of poliomyelitis with polioencephalitis of Wernicke. In a few cases it was noticed that the children were affected by true infantile hemiplegia; and this disease appears to have been more common during last summer than usual, although by no means occurring in such frequency as poliomyelitis. The increased frequency, however, of the disease leads to the natural supposition that the infectious agent in some cases involved the motor nuclei of the lower segment, the spinal cord, the medulla, pons, and crus, and in other cases involved the motor nuclei of the cortex, producing the infantile hemiplegia or encephalitis of Strumpell.

In the cases of poliomyelitis where the legs were affected it was not at all uncommon to have retention of urine and loss of control of the bladder extending through several days, but in no case has a permanent loss of control been found. In many cases where the arms were affected the respiratory muscles were also involved, and in fatal cases death occurred from respiratory paralysis or from heart failure rather than from any febrile affection. When the face was affected a typical Bell's palsy was usually present with inability to close the eye and with a reaction of degeneration in the facial muscles. In the cases where the eyes were affected strabismus, either internal or external was observed, but this, as a rule, was temporary and in no cases that I have seen has a permanent strabismus remained. The paralysis was always of the flaccid type

* Read in the Section on Nervous and Mental Diseases of the American Medical Association, at the Fifty-ninth Annual Session, held at Chicago, June, 1908.